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First Named Inventor: Klaus Hartig

Application No.: 10/735,295

Group Art Unit: 3634

Filed: December 11, 2003

Examiner: Jerry E. Redman

Title: REVERSIBLE SELF-CLEANING WINDOW ASSEMBLIES OF
METHODS OF USE THEREOF

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

AMENDMENT

In response to the Office Action mailed April 30, 2007, please amend the above-identified application as set forth below.

Amendments to the Claims are reflected in the listing of claims beginning on page 2 of this paper. Changes are shown with deletions being designated by strike-through or double-brackets and insertion of new language being underlined.

Remarks begin on page 5 of this paper.

Amendments to the Claims

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently Amended) A reversible self-cleaning window assembly comprising:
 - a) a reversible frame assembly including a window sash adjoined to an outer frame by one or more pivoting devices; and
 - b) a substrate retained by the window sash including an exterior face and an interior face, wherein ~~one or more photocatalytic layers are applied to~~ the substrate bears a photocatalytic coating on both the exterior face and interior face.
2. (Original) The reversible self-cleaning window assembly according to claim 1, wherein the substrate is a glass pane.
3. (Original) The reversible self-cleaning window assembly according to claim 1, wherein the substrate is an insulated glass unit.
4. (Currently Amended) The reversible self-cleaning window assembly according to claim 1, wherein the photocatalytic coating includes a layer comprising ~~layer comprises~~ an oxide of a metal selected from the group consisting of titanium, iron, silver, copper, tungsten, aluminum, zinc, strontium, palladium, gold, platinum, nickel, and cobalt.
5. (Original) The reversible self-cleaning window assembly according to claim 4, wherein said metal oxide comprises titania.
6. (Currently Amended) A reversible self-cleaning window assembly comprising:
 - a) a transparent substrate having generally opposed first and second faces, wherein the substrate bears a functional coating on both the first and second faces, ~~each face bearing a functional coating,~~ the said functional coating comprising a photocatalytic material adapted to

chemically degrade organic contaminant that accumulates on the first or second face of said substrate when exposed to ultraviolet radiation; and

b) an outer frame operably adjoined to a sash, said sash supporting the substrate, and wherein the outer frame and sash are configured to allow the substrate to be selectively oriented in a primary orientation or secondary orientation, the primary orientation characterized in that said first face is exposed to a high ultraviolet radiation environment and said second face is exposed to a low ultraviolet radiation environment, the secondary orientation characterized in that said second face is exposed to said high ultraviolet radiation environment while said first face is exposed to said low ultraviolet radiation environment.

7. (Original) The reversible self-cleaning window assembly according to claim 6, wherein the transparent substrate is glass.

8. (Original) The reversible self-cleaning window assembly according to claim 6, wherein the transparent substrate is an insulated glass unit.

9. (Original) The reversible self-cleaning window assembly according to claim 6, wherein the sash is configured such that when the transparent substrate is secured in the outer frame, it can be removed and resecured in either the primary or the secondary orientation.

10. (Original) The reversible self-cleaning window assembly according to claim 6, wherein the window assembly includes a pivot device about which the transparent substrate can be rotated between the primary and secondary orientation.

11. (Original) The reversible self-cleaning window assembly according to claim 6, wherein the photocatalytic material comprises sputtered material.

12. (Currently Amended) The reversible self-cleaning window assembly according to claim 11, wherein the photocatalytic material layer comprises sputtered material having a substantially uniform thickness over the first face and second face of the substrate.

13. (Original) The reversible self-cleaning window assembly according to claim 6, wherein said photocatalytic material comprises an oxide of a metal selected from the group consisting of titanium, iron, silver, copper, tungsten, aluminum, zinc, strontium, palladium, gold, platinum, nickel, and cobalt.

14. (Original) The reversible self-cleaning window assembly according to claim 13, wherein said metal oxide comprises titania.

Claims 15-22 (Canceled).

REMARKS

Claims 1-22 are pending. Claims 15-22 have been withdrawn pursuant to a restriction requirement and are hereby canceled. By this amendment, claims 1-14 are pending. No new matter will be incorporated into the present application by entry of this Amendment. If the Office determines that any additional fees are deemed to be necessary with the filing of this Amendment, then the Office is authorized and requested to charge such fees to Deposit Account No. 061910.

Applicant maintains that the original claims are patentably distinct over the cited references. The present Amendment, however, is being filed to focus the pending claims on embodiments that may be separately commercialized, separately licensed, or both. Insofar as the original claims are concerned, Applicant expressly reserves the right to pursue those original claims, or other claims not reciting the features of the present claims, in further prosecution.

In the Office Action, the Examiner rejected claims 1-14 under 103(a) as being unpatentable over U.S. Patent No. 4,235,048 to Gillery ("Gillery") in view of U.S. Patent Application Publication No. 2002/0045073 to Finley ("Finley"). Applicant respectfully requests reconsideration.

The Examiner bears the initial burden in establishing a prima facie case of obviousness when rejecting claims under 35 U.S.C. §103. In re Piasecki, 745 F.2d 1468, 223 USPQ 758 (Fed. Cir. 1985); In re Reuter, 651 F.2d 751, 210 USPQ 249 (CCPA 1981). If the Examiner does not produce a prima facie case, the applicant is under no obligation to submit evidence of non-obviousness.

To properly establish a prima facie case of obviousness, MPEP § 706.02(j) identifies three basic criteria that must be met. First, the prior art reference (or references when combined) must teach or suggest all of the claim limitations. Second, there must be some suggestion or motivation in the references themselves or in the knowledge generally available to one of ordinary skill in the art to modify the reference or combine reference teachings. Finally, there must be a reasonable expectation of success. In re Vaeck, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

The Examiner has failed to establish a prima facie case of obviousness because the cited references fail to teach or suggest all of the claim limitations. Prior art references used in an

obviousness rejection must teach or suggest all of the claim limitations. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). Independent claim 1 calls for, *inter alia*, substrate including an exterior face and an interior face, wherein the substrate bears a photocatalytic coating on both the exterior face and the interior face. Independent claim 6 calls for, *inter alia*, a transparent substrate having generally opposed first and second faces, wherein the substrate bears a functional coating on both the first and second faces, said functional coating comprising a photocatalytic material. The references fail to specifically disclose a substrate bearing a photocatalytic coating (or functional coating comprising photocatalytic material) on both surfaces. With reference to Figure 1 below, Finley only discloses depositing a photocatalytic coating 28 on one surface 24 of a substrate 22. *See para [0024] of Finley*. The opposite surface 26 of the same substrate can optionally be provided with an optional functional coating 40. *See para [0031] of Finley*. However, Finley fails to disclose that the optional functional coating 40 can be photocatalytic.

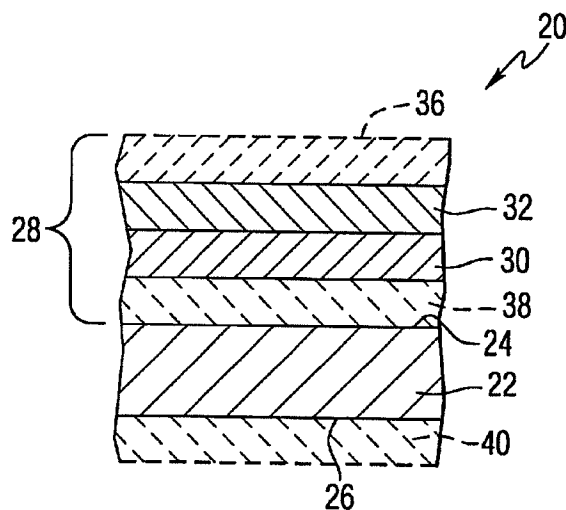
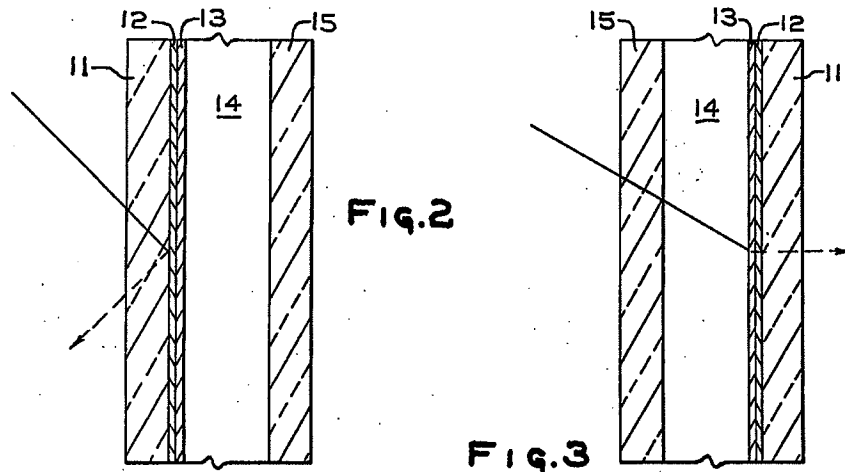


FIG. 1

Figure 1 of Finley

In addition, Gillery fails entirely to disclose a photocatalytic coating. Gillery also fails to disclose a substrate bearing a coating on both surfaces. Rather, Gillery only discloses providing a coating on one side of a single substrate. With reference to the Figures below, Gillery discloses a double glazed window having transparent substrates 11 and 15. Substrate 15 does not bear any coating at all and substrate 11 has only a single surface bearing a layer of metal 12 that reflects solar

energy and a coating layer 13 that absorbs solar energy. *See, e.g., Col. 1, lines 57-68 of Gillery.* The surface opposite to the surface bearing the metal 12 and coating layer 13 does not include a coating.



Figures 2 and 3 of Gillery.

Thus, the references fail to specifically disclose the claimed structures, wherein opposed surfaces of a single substrate bear a photocatalytic coating (or functional coating comprising photocatalytic material).

The Examiner also failed to establish a *prima facie* case of obviousness because the Examiner has not shown there to be any suggestion or motivation in the references themselves or in the knowledge generally available to one of ordinary skill in the art to modify the reference or combine reference teachings. In fact, Gillery actually teaches away from a window assembly having a substrate wherein opposed surfaces bear a photocatalytic coating (or functional coating comprising photocatalytic material). A reference may be said to teach away when a person of ordinary skill, upon reading the reference, would be discouraged from following the path set out in the reference, or would be led in a direction divergent from the path that was taken by the Applicant. *In re Gurley*, 27 F.3d 551, 31 U.S.P.Q.2d 1130 (Fed. Cir. 1994).

With continued reference to Gillery's Figures 2 and 3, illustrated above, Gillery's double glazed window provides different functions depending upon the orientation of the window. When the substrate 11 is oriented towards an outdoor environment, as shown in Figure 2, the

window is in "summer orientation" and solar energy is reflected by the metal layer 12. This keeps the building cool. When the window is reversed and the substrate 15 is oriented toward an outdoor environment, as shown in Figure 3, the window is in "winter orientation" and solar energy passes through the window and is absorbed by coating layer 13. A significant portion of the energy is conducted through the metal layer 12 and substrate 11 to the interior space of the building. This keeps the building warm. *See, e.g., Col. 1, lines 57-68 of Gillery.* Thus, Gillery's window is made reversible because different functions are accomplished depending on whether the window is in "summer orientation" or "winter orientation".

On the contrary, Applicant provides a photocatalytic coating on each side of a reversible window. Applicant has found that providing such an arrangement provides exceptional self-cleaning to two surfaces of a single window. The photocatalytic coating on the surface facing an outdoor environment self-cleans using exposure to ultraviolet radiation in the sunlight. Once that window has been self-cleaned, a user reverses the window so that the photocatalytic coating on the opposite surface also self-cleans. This allows for both surfaces of a single substrate (and thus a single window) to remain as clean as possible. However, the function of the window remains the same regardless of which substrate surface is facing an outdoor environment. There is simply no "summer orientation" and "winter orientation" or any two different orientations. Gillery teaches away from the claimed invention because it teaches making a window reversible solely because the window has either reflecting or absorbing functions depending on its orientation. A skilled artisan would not provide a photocatalytic coating having the same self-cleaning functions on each side of a window and then make the window reversible. Rather, the artisan would deem this arrangement to be unnecessary and complex. Instead, the artisan would simply provide a single photocatalytic coating on one side of the window where self-cleaning is desired and avoid making the window reversible.

In view of the foregoing amendments and remarks, it is submitted that all the claims of the application are in condition for allowance. Favorable consideration and prompt allowance of

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the application are respectfully requested. The Examiner is invited to telephone the undersigned if the Examiner believes it would be useful to advance prosecution.

Respectfully submitted,

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